

# BULLETIN

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## The Chicago Academy of Sciences

1. The Digitations of the Mantle in Physa.
2. Description of a New Species of Limnæa.

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FRANK COLLINS BAKER

Curator of The Chicago Academy of Sciences.

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ISSUED JULY 1, 1901

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## I THE DIGITATIONS OF THE MANTLE IN PHYSA.

FRANK COLLINS BAKER.

If the edge of that part of the mantle of *Physa* which is reflected over the parietal wall is examined, it will be found to consist of a greater or less number of little finger-like digitations and the fact will also be noted that these projections are placed in two series, one near the umbilical region and one at the posterior extremity of the aperture, a simple or smooth space of the mantle edge connecting and lying between these two series. A more detailed examination will show that the form, number, and general position of the digitations vary in a wonderful degree in different individuals of the same species. In the present paper several of our common species are discussed.

American literature contains but few references to the digitate mantle of *Physa*. Haldeman says,\* "Inner and posterior edge of the mantle digitate." Binney says,\*\* "Mantle covering part of the shell, the margin fringed or digitate." Thomas Say, whose careful delineation of species is unsurpassed in American conchological literature, says of the animal of *heterostrophæ*:† "The mantle is trifid at the base of the pillar lip and at the upper corner of the aperture.

These references show that little or no attention has been paid to the study of this part of the animal.

The material upon which this paper is based was personally collected in Providence, R. I., Rochester, N. Y., and Chicago, Ill. Many specimens have been examined, including individuals of all ages. The writer has been struck with one fact which stands out prominently, that the species with shell exhibiting little or no variation, as *Physa integra*, had the marginal digitations very uniform, while in those species subject to great variation, as *Physa gyrina*, there was a corresponding variation in the mantle margins, which fact shows that the shell and animal are correlated as to variability.

\* A Monograph of the terrestrial Univalve Mollusca of the United States, Physidæ, p. 29, 1842. Tryon, Contr., p. 125.

\*\* Land and Fresh Water Shells of North America, part II, p. 75, 1865.

† Binney, Land and Fresh Water Shells of North America, p. 24.

The writer is indebted to the following persons for assistance in either notes or specimens: Mr. Bryant Walker, Detroit, Mich., and Mr. Harry S. Hall, Rochester, N. Y.

In the following descriptions the region of the posterior part of the aperture will be termed the apex and the columella region the columella.

***Physa integra*** Haldeman, pl. I, A, B.

The mantle margins of this species are very uniform. The normal form has 3 rather long, narrow digitations at the apex and 4 in the columella region (B). About two per cent. of the specimens examined had 5 digitations in the columella region and 3 at the apex (A). A very small percentage had 4 short digitations at the apex and in one or two specimens the apical digitations were very small or wanting. Over fifty specimens have been examined.

*Physa integra* is common in the Erie Canal and Genesee River, where it is very uniform. The white, thickened lip of this species is very characteristic, and the majority of specimens have the various rest periods marked as white longitudinal stripes on the older whorls of the shell. When alive the white lip is the most conspicuous part of the animal.

***Physa gyrina*** Say, pl. I, C to I, L to O.

As might be expected, the mantle margins vary more in this species than in any other member of the genus which has been examined, thus being coördinate with the variation in the shell. The normal form appears to have 4 long, narrow, equal apical digitations, and 6 in the columella region, the latter having central projections somewhat longer than those on either side, as shown in figure M. From this type the variation is almost endless. The digitations at the apex vary from 2 (I) to 5 (M), and any one of the projections may be short and stumpy (H) or very long and slender (L); or the entire apical portion of the mantle may be made up of 4 small, rounded knobs (C). The digitations in the columella region are also very variable. The smallest number seen was 4, small and finger-like (C), and the largest 10, of which 5 were very large and long and 5 were very short, 2 on one side and 3 on the other (N). Several specimens examined had 6 columella digitations, in which there were 2 long projections with a small tubercle on each side (L).

Another variation, seen in several specimens, was 3 large and 3 small digitations (G. O.), and in a number of individuals the number was 8, all of which were nearly equal (F).

The greatest variation was found among specimens from the Genesee River and the Erie Canal. Several specimens from Providence, R. I., were very uniform, the extremes of variation being apex 2, columella 5 (I), and apex 5, columella 6 (H). Mr. Bryant Walker finds the Michigan *gyrina* to vary as follows: apex, 4 to 5; columella, 3 to 6. The numerous figures on the first plate show the extremes of variation, both in number and form.

**Physa heterostrophæ** Say, pl. I, J, K.

This species does not exhibit the variation shown in either *gyrina* or *sayii*. The normal form has 4 digitations in the apical and 5 in the columella region. The apical projections vary from 3 to 4, and the columella from 4 to 6. The digitations are very uniform in size, being rather long and tapering.

Judging from the writer's experience in Physæ, *heterostrophæ* is quite rare, instead of being very common, as is generally reported. No undoubted specimens have been seen from Rhode Island, and in western New York it is rare, as is also the case in northern Illinois. It should be borne in mind that the shell of *heterostrophæ* is smooth, while that of *gyrina*, *sayii*, and others is encircled by fine, impressed, spiral lines.

**Physa sayii** Tappan, pl. 2.

Although the shell is quite uniform in *sayii* the mantle margins show a wide range of variation. The normal form has 4 apical digitations and 5 columella digitations (H). The former vary from 4 to 5 and the latter from 4 to 8. In form they are mostly long and tapering, although a few are short and stumpy, as in B. One specimen had a split digitation in the columella region (H), and several specimens had all the projections very small, rounded, and stumpy (G). The plate shows these variations sufficiently.

**Physa vinosa** Gould.

Mr. Bryant Walker has given me the following data for this species: The digitations were longer and more slender than in *gyrina*; four out of six examples had 5 columella digitations and two had 4 columella digitations, while four specimens had the apical digitations 3, and two had 4.

**Physa traskii** Lea.

Specimens of this species recently collected by Mr. Frank M. Woodruff, at San Diego, Cal., exhibit the following variations: apical digitations 3, 4, 5; columella 5, 6, 7, 8. The digitations are generally very uniform, long and tapering, but occasionally the variation in size is considerable, as in the figure of *sayii* on plate II, figure E.

When the writer began these investigations he hoped that in them he would find some help in drawing specific lines in this very variable family. Such has not been the case, however, for nearly all of the species vary greatly and all seem to have about the same range of variation. It was thought that the digitations were, in a measure, able to contract and expand, but there is not evidence enough as yet to establish this as a fact beyond question. Several species appeared to have this power over the digitations of the mantle. This is a subject for future investigation.

**COMPARATIVE TABLE OF VARIATION.**

Integra.			Gyrina.			Heterostropha.			Sayii.			Traskii.			Vinosa.		
A*	C	N	A	C	N	A	C	N	A	C	N	A	C	N	A	C	N
0	4	2	2	4	4	3	4	4	4	4	7	3	5	2	3	5	4
3	4	49	2	5	1	4	5	14	4	5	27	4	5	6	4	4	2
3	5	3	3	4	4	4	6	2	4	6	6	5	6	2			
4	2	2	3	5	6				4	8	2	5	7	1			
4	3	2	3	6	8				5	6	2	5	8	1			
4	4	2	4	4	20				5	7	3						
			4	5	25				6	6	3						
			4	6	100												
			4	7	10												
			4	10	6												
			5	4	11												
			5	6	25												
			5	8	30												
60			250			20			50			12			6		

\* A=anterior; C=columella; N=number of specimens examined.

## 2 DESCRIPTION OF A NEW SPECIES OF LIMNÆA.

FRANK COLLINS BAKER.

*Limnæa woodruffi* sp. nov. Text figure.

*Shell*: Ventricose, very much inflated, solid; color greenish horn or olivaceous; surface shining, growth lines distinct; rough in some specimens, crossed by numerous fine impressed spiral lines; apex small, rounded, light horn colored; whorls 3-4, rounded, inflated, the last occupying nearly the whole of the shell; spire depressed; sutures impressed; aperture very large, roundly ovate, occupying about four-fifths of the length of the entire shell, roundly shouldered at the upper part; peristome thin, sharp; columella thickened, spreading, with a plait or fold in the middle; the lower part of the aperture is expanded, the columella callus making a ridge which is reflected over the umbilical region; umbilicus open, deep.



Length 12.50; width 8.00; aperture length 8.50; width 5.50 mill.

Length 11.00; width 8.00; aperture length 8.00; width 5.00 mill.

Length 11.50; width 8.00; aperture length 8.00; width 4.75 mill.

*Animal, Jaw, Radula and Genitalia*: Not examined.

*Distribution*: Southern part of Lake Michigan.

*Habitat*: Probably similar to *catascopium* and *emarginata*.

*Remarks*: This species has puzzled the writer for many years and has been referred to both *decollata* and *catascopium*.\*

It certainly is not any form of *catascopium*, and, judging by the figures in Binney, Haldeman and Tryon, it is not *decollata*. Specimens of the latter received from the Philadelphia Academy of Sciences are decidedly different, the spire being longer, the

\*In the writer's paper on the *Limnæa* of Northern Illinois, in Trans. St. Louis Acad. Sci., Vol. IX, No. 1, pl. 1, fig. 12, this form was referred to variety *pinguis* Say. The receipt of a large number of specimens has demonstrated that it is not that form.

number of whorls less and the shape of the aperture is dissimilar. The principal characteristics of *woodruffi* are its very short spire, rapidly increasing and swollen whorls, and its roundly oval aperture with its broad shoulder at the upper part. It looks not unlike a miniature *Limnæa emarginata*, variety *mighelsi*. The present species has been described as new for the reason that in a lot of some two hundred specimens no individual has been found connecting it with any known form. It has been found at Millers, Ind., and along the lake shore in Chicago, by Mr. Frank M. Woodruff, to whom the species is dedicated.

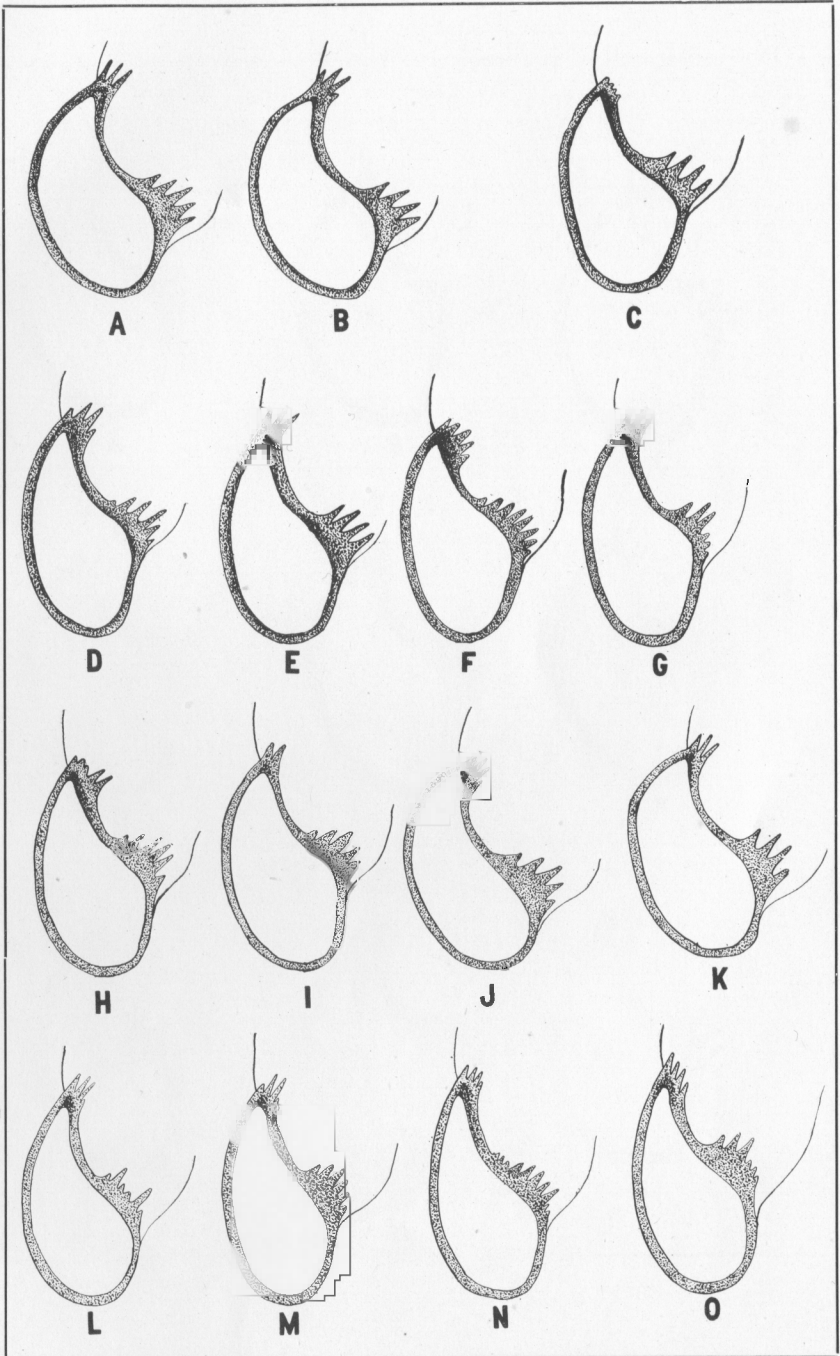


PLATE II.

